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I, LEANNE MYNOTT, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 2970 for a patent by CAMATIC PTY. LIMITED filed on 21 September 1999.

WITNESS my hand this
Twentieth day of October 2000

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PROVISIONAL SPECIFICATION

APPLICANT: CAMATIC PTY. LIMITED
NUMBER:
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Invention Title: SEATING SYSTEM

The invention is described in the following statement:-

SEATING SYSTEM

This invention relates to a seating system and in particular, for a system which is adapted for use in stadiums and in auditoriums. In our description we will refer, generally, to stadium seating but this is not to limit the concept of the invention in any way.

Stadium seating is usually based about beams or the like which are connected either directly or indirectly to a floor or vertical riser in the stadium, individual seats are then connected to the beam by way of a clamp or the like which clamp has one component on the seat and one component which can be placed thereover on the other side of the beam and the two can be interconnected. Generally this means that the system is designed for a particular seating arrangement and although individual seats can be removed and replaced, the actual arrangement of seats is basically fixed.

In an alternative arrangement the beam has been provided with plates or the like which are welded or otherwise permanently attached thereto to which individual seats are connected.

In a still further arrangement, individual seats can be connected to the floor or riser.

These arrangements are very inflexible and are usually designed for the particular stadium in a particular configuration and can not be varied from this.

One object of the invention is to provide a seating system whereby the location of the seats is very much more flexible than has previously been the case.

The invention, on its broadest sense, comprises a seating system having a beam which is adapted to be connected to a surface adjacent the position at which seats are to be located, means whereby at least one seat can be connected to the beam characterised in

that the beam is so formed as to be adapted to receive a formation on the base of a seat whereby the seat can be located at any required position along the beam.

The beam may comprise an extrusion having two spaced parts one of which is adapted to receive means whereby the extrusion can be connected directly or indirectly to a support and the other part provides means whereby seats can be connected to the extrusion, the two portions of the beam being arranged that connection of seats to the extrusion is in no way obstructed by the connection of the beam to supports.

Then a third aspect of the invention we provide a seat for a seating system which has a back member which is adapted to carry the load of the seat and a seat support which has two arms which are adapted for connection to the back member at two spaced positions so that effectively a truss is formed, one of the arms of the support being adapted to be connected to a beam to locate the seat and the support also having means whereby a seat assembly can be connected thereto.

The seat support may include a pivot so the seat can be pivotally connected thereto.

The invention also provides a seat having means whereby identification can readily be provided it may also be provided with means whereby a writing tablet or an audio/visual display can be associated therewith.

Seats can also be provided with means whereby they can be readily upholstered and re-upholstered can be supplied with arms, extended backs and have other modifications associated therewith without any necessity for re-engineering.

In order that the invention may be more readily understood we shall describe one particular embodiment of the invention together with certain modifications that can be made to it.

Seats of the invention are adapted to be connected to a beam which in a preferred form is an aluminium extrusion which is adapted to be connected to fittings located on the floor where the seats are to be located or on a riser behind the required position for the seats.

When one considers stadium seats it will be appreciated that these are normally located on a flat portion with a riser directly behind so that the seats are stepped to enable good vision from all seats.

This is not essential to the invention but where there is such a riser it is often convenient to attach the beam to this.

We provide mounting blocks, which may be made of a glass reinforced plastics material, such as a glass reinforced polyamide and may have an apertured plate whereby the connection to the surface may be made. The blocks also have a forwardly or upwardly extending portion to permit connection of the beam. In one form of the invention we may provide an intermediate member which can be connected to the mounting block and to which the beam can be connected.

One aspect of the invention is because the mounting blocks do not in any way adversely effect the positioning of the seats on the beam these can be fitted at positions which are desirable to the fitter and are not constrained to be fitted to specific positions, which has been the case in the past.

That is, should there be any flaw in the concrete where a mounting block is to be connected or should there be a ventilating duct or cable duct or the like, the mounting block can simply be located in a position adjacent this.

The beam extrusion, has, at its lower end, a pair of inturned arm which define a cavity which is adapted to receive a connector.

This connector may be of aluminium, has an internal shape to be received in and moved along the cavity and may have a central apertures which, in a preferred form, has a recess directly towards the extrusion the recess being able to receive a bolt head and it may be so formed as to receive a formed bolt to prevent this from rotation relative thereto.

When locating the beam the required number of mounting blocks are provided and an equivalent number of connectors are located in the beam and each is associated with a mounting block and any interconnector member associated therewith. Before locating the connector member into the beam a bolt is passed therethrough and these bolts are passed through corresponding apertures in the mounting blocks or intermediate members. It is only necessary to then place a nut on these bolts tighten the nuts and the connector pulls down onto the beam and the support assembly is firmly located.

However should it ever be necessary to remove the beam this can readily be done. Simply by removing the nuts holding the connectors down and this permits the beam to be removed or, alternatively, the nuts can be loosened and the beam can be moved longitudinally.

It will be seen that as the connectors are located in a recess on the under part of the extrusion the remainder of the extrusion is remote from the connectors so there is no obstruction caused by them to the seats.

The seats of the system may have a complete body shell or, preferably, may have a back portion and a seat portion, with the seat portion pivotally connected to the back portion so that when the seat is not being used it can be biassed to rotate upwardly adjacent the back portion to provide minimal obstruction to persons moving along the aisle of the stadium.

This of course is conventional in the art.

In the seat of the invention the back portion may be basically structural and be adapted to carry the weight of the seat. This can be provided by providing a reinforcing loop passing basically around the periphery of the back and by using an engineering grade plastic of the required thickness to give the strength needed.

Associated with the back, there may be a pair of seat supports, one on each side thereof and each seat support may comprise two arms interconnected at their centre where there is provided the seat rotation mechanism.

The support can be injection moulded and, again, could be a glass reinforced plastics material which can have the required strength characteristics.

The free end of one arm which is upwardly directed can be adapted to contact a complimentary shaped part of the seat back within which it can be received and can be held in position by a screw or the like passing through the back into a threaded insert in the free end of the arm.

By placing this arm into the complimentary recess, the load is passed through the material of the back rather than the screw which is effectively simply to hold the components together.

Adjacent the free end of the other, lower arm there can be an extension which can pass into an aperture in the lower side of the seat back, the arrangement being such that once this is located and the free end of the other arm is positioned in the recess, the assembly is held together by the single screw.

At the free end of the lower arm there is a formation which is complimentary to the upwardly directed portion of the beam.

We previously stated that the extrusion comprising the beam has two effectively separate parts and this upper part can well have a nose which is directed inwardly and a curved upper surface having at its free end a return.

The corresponding lower arms have a return portion which are adapted to pass over and behind the nose, an intermediate portion which can be curved to correspond with the curved portion of the extrusion and a further forwardly directed portion.

Provided on the forwardly directed portion of the arm there can then be a toggle fastener which can be moved from a position where it is free of the extrusion to a position when the seat assembly is located thereover it can pass under the return portion of the extrusion and be tightened to prevent any movement of the seat.

This arrangement is most satisfactory as it means there are no free components which have to be handled separately from the rest of the seat, the seat can simply be brought into position, the lower arms on each side passed over the nose of the extrusion, the seat moved downwardly about the nose until the curved portion abuts the curved portion of the extrusion and the toggle fastener rotated to lock the seat into position.

This arrangement gives the seat of the invention one of its major advantages.

Firstly, at any time, the seat can be removed from the beam simply by releasing the two toggle fasteners and lifting the seat away from the beam. Further, if it is required to vary the spacing of seats, it is relatively simple to loosen the toggle fasteners and simply slide the seats along the beam so that they are either spaced a greater or lesser distance from each other.

There are specific applications, as will be described hereinafter where it is essential that the spacing of the seats be greater than in the basic configuration and it means that if it is required to change the configuration of the seats at any time there is no necessity to

make any alteration to the beam or to the seats to permit the adjustment. Specifically, the seats can be removed past mounting blocks without having to be disconnected from the beam.

This provides a substantial advantage to the stadium operator as these modifications can be done by unskilled or semi-skilled persons without the necessity of the use of any tools other than a spanner to release the tension on the toggle.

The seat component itself, where this is pivoted, is connected to the pivot arrangement at the junction of the two arms and a helical spring or the like can be provided so that the seat, if not loaded, can be moved to a position adjacent the back to enable movement therepast or simple cleaning thereunder but there is no upward pressure while the seats is used. It will be seen from the foregoing that the whole of the seat assembly, with the exception of the inserted threaded portion at the free end of the upwardly directed arm which is connected to the back, the spring for the return of the seat and a further inserted thread which can be used to hold the seat in position and the toggle are made of plastics material.

The plastics material used may be varied, we have made certain statements about the structural parts in the back and seat members themselves can be made out of engineering grade plastics material by injection moulding.

It is preferred that the material is either black or of a dark colour to minimise degradation after long contact with ultra-violet light.

There can be associated with the ends of the beam, end caps which ensure no sharp edges of the extrusion are directed outwardly and if required these end caps may incorporate material, such as row numbers. Also, if required these could be illuminated by cabling passing through the body of the beam.

It is also possible to provide further cabling associated with the beam whereby audio/visual or other signals are also transmitted, this will be described hereinafter.

Another aspect of the invention is that seats can be located so that one side is connected to one beam and the other to a second beam with the beams at an angle to each other. The connector on the lower arm of the seat support can have a degree of movement relative to the beam or can be provided with means whereby a portion can be removed to give such a degree of movement so that one member is connected to one beam and another member is connected to an adjacent beam with there being an angle of, say, up to 10 degrees between the two beams.

This is a particularly useful aspect where the location of the stadium seats are required to be curved, say to follow a boundary of the stadium, as, if a number of relatively short beams are used there is no restriction on the location of the seats as should it be required they can span two adjacent beams. This means there does not have to be a gap left where the different beams are located.

The seat of the invention may be provided with a large number of variations.

For example, the seat portion may be provided with upwardly directed mushroom type extensions which are adapted to receive keyed slots in a cushion portion so this can be located on the seat simply by passing a larger diameter portion of the slot over the mushroom head and then moving the cushion towards the back of the seat.

This cushion can then be located by one screw or the like. Thus, should there be any damage to the cushion at any time it is simple to replace the cushion portion and it is unnecessary to move the seat.

Also, if required, on the front of the seat portions there can be a cut out recess into which can be passed a corresponding member which can incorporate a seat number and, if required can be colour coded.

Similarly we may prefer to provide a recess in the seat back which is on the forwardly directed part of the back but is basically in alignment with the recess which receives the free end of the upwardly directed arm of the seat support which may incorporate the aperture through which the screw holding the support in position is passed. This recess can be provided with a cover member which is of the same colour as the remainder of the back or, if required, could be of an identifying colour which could be the same as that used on the seat number on the seat portion.

Thus, it is possible to define positions in the stadium by the use of a colour to indicate whereabout on the boundary of the stadium the seat is located, the row, which can be provided in the cover at the end of the beam at the aisles and the seat number.

Each seat can be modified in a substantial number of different ways.

For example, if it is required to have arm rests on the seat these can simply be located in position at the pivot area of seat supporting pivots and can readily be fitted by the stadium operator after the seats have been located.

If the seats were originally located very close together it may be necessary to move or to space them somewhat to provide room for the arms but as described earlier this is a simple and non-skilled operation.

We can provide high backs for the seats. These can serve two purposes. Firstly, they can give an impression of additional value and can add to comfort and secondly, they can provide additional height to the seat back as far as a person walking along the row behind is concerned. This can be particularly valuable in stadiums which rise steeply as

persons could suffer vertigo or discomfort whilst walking along a row of seats where there appears to be no form of support on the low side.

These additional seat backs can take any required form but we do prefer to leave a space between the original back and the additional back to permit circulation of air behind the user.

We can, if required, provide writing tablets associated with each seat, although these would normally be used in auditoria rather than in stadiums and in each case the tablet can fold away to a position beside the seat when not being used. It can be raised upwardly and positioned in front of the user when it is being used. Again, these use additional space and if the seats were originally closely spaced they can simply be moved outwardly to permit the location of the writing tablets after the seats are already in position.

Also, if required, we can space the seats and locate beam mounted tables between the seats.

This can be useful in suites in hospitality areas where space is not necessary of a premium but where it is desired to make the users feel comfortable.

In a still further application we can locate an audio/visual screen in a manner not dissimilar to the writing tablets so the screen is normally located between adjacent seats but can be drawn upwardly and around so that it is located in front and generally to one side of the user. Such arrangements can be most useful where the event taking place is being televised or where replays or the like are desirable. In these cases each user has their own screen and if required additional audio material associated therewith.

If required, the seats themselves could be arranged to be folded and moved under a cover or otherwise located when not required.

It is also possible to provide seats which are able to be pivoted away from the beam to open a space for, for example, a person in a wheelchair to be able to have access to an area in their chair.

In the specification we have described one particular form of seat and many possible variations in this and it is to be understood that these are not exhaustive but other variations can be provided without departing from the spirit and scope of the invention.

DATED this 21st day of September, 1999

CAMATIC PTY. LIMITED
By Its Patent Attorneys
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